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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/727,661	12/05/2003	Keiichi Seki	244946US0CONT	6714

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OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
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ALEXANDRIA, VA 22314

EXAMINER

RUTHKOSKY, MARK

ART UNIT	PAPER NUMBER
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1745

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	03/30/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 03/30/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/727,661

Applicant(s)

SEKI ET AL.

Examiner

Mark Ruthkosky

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>12/5/2003</u> . | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 1745

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

The information disclosure statement filed 12/5/2003 has been placed in the application file, and the information referred to therein has been considered as to the merits.

Drawings

The drawings filed on 12/5/2003 have been approved.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contain subject matter, which was not described in the

Art Unit: 1745

specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and use to make and/or use the invention. The limitation that “the enthalpy of a neutral molecule and the enthalpy of an anion radical are, respectively, obtained by quantum chemical calculations by an ab initio restricted Hartree-Fock molecular orbital method employing 6-31G* basis function system” does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the subject matter which the applicant regards as his invention. Quantum chemical calculations are complicated and not obvious to one of ordinary skill in the battery art. Applicant has not provided, in full, clear, concise, and exact terms how to determine the enthalpy of a neutral molecule and an anion radical, respectively, obtained by quantum chemical calculations by an ab initio restricted Hartree-Fock molecular orbital method employing 6-31G* basis function system.

Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The limitation that “the enthalpy of a neutral molecule and the enthalpy of an anion radical are, respectively, obtained by quantum chemical calculations by an ab initio restricted Hartree-Fock molecular orbital method employing 6-31G* basis function system” does not distinctly claim the subject matter which the applicant regards as his invention. Quantum chemical calculations are complicated and not obvious to one of ordinary skill in the battery art.

Claim Objections

Claims 1-20 are objected to because of the following informalities:

Art Unit: 1745

In claim 1, a calculation method includes the number sign (#) in parenthesis. It appears that the number sign should include a number. It is not clear what the number sign means. Since there is only one calculation method in the claim, it appears that the number sign should be removed from the claim.

In claim 1, sol and add subscripts should be defined in the claim. As additive is abbreviated add, then the abbreviation should be shown after the word additive to show the relationship. Since both solvent and solute are used in the claims, it is not clear which abbreviation sol represents. Further, the symbol α , alpha, is used in the claim to represent the additive in claims 1 and 3; however, the symbol is not used in the claims apart from the term "additive." Therefore, the α , alpha, should be removed from the claim, as it does not appear to serve a purpose. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Art Unit: 1745

In the following rejections, the references do not teach the calculation method of determining the enthalpy of the additive in the battery electrolyte; however, the compounds in the electrolytes of the prior art are the same as in the instant application and, therefore, have the equivalent values and features. The claims are to a product. MPEP 2113 states, "Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process."

Claims 1-4, 7, 8, 9 and 17-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Mikhaylik (US 6,436,583.)

The instant claims are to a lithium secondary cell comprising a cell element which comprises a positive electrode, a negative electrode, an electrolyte comprising a non-aqueous solvent and a solute, and a variable shape casing which accommodates the cell element, wherein the cell element contains an additive α , and $\Delta E_{add}(AN)$ is smaller than $\Delta E_{sol}(AN)$, where $\Delta E_{sol}(AN)$ is the difference represented by $E_{sol}(A) - E_{sol}(N)$, where $E_{sol}(N)$ is the enthalpy of a neutral molecule of the non-aqueous solvent and $E_{sol}(A)$ is the enthalpy of an anion radical formed by giving one electron to the neutral molecule, as obtained by a claimed calculation method, and $\Delta E_{add}(AN)$ is the difference represented by $E_{add}(A) - E_{add}(N)$, where $E_{add}(N)$ is the enthalpy of a neutral molecule of the additive α and $E_{add}(A)$ is the enthalpy of an anion

Art Unit: 1745

radical formed by giving one electron to the neutral molecule, obtained by a claimed calculation method.

Mikhaylik (US 6,436,583) teaches a lithium secondary cell comprising a cell element which comprises a positive electrode, a negative electrode, an electrolyte comprising a non-aqueous solvent and a solute, and a variable shape casing which accommodates the cell element, wherein the cell element contains an additive α , and $\Delta E_{add}(AN)$ is smaller than $\Delta E_{sol}(AN)$, (claims 1-37.) The electrolyte may be a polymer gel and includes acrylic materials (col. 6, lines 55-end.) The electrolyte additive includes a variety of sulfites (claims 5-10.) The concentration of additive is in the range of 0.001-30 parts by weight. A plurality of solvents are taught including tetrahydrofuran, which is noted as a solvent in applicant's instant specification (page 27.) Glymes, such as di- and tri- methoxymethane and glycol ethers are noted (claim 11.) Thus, the claims are anticipated.

Claims 1-10 and 17-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Gan et al. (US 6,444,360.)

Gan et al. (US 6,444,360) teaches a lithium secondary cell comprising a cell element which comprises a positive electrode, a negative electrode, an electrolyte comprising a non-aqueous solvent and a solute, and a variable shape casing which accommodates the cell element, wherein the cell element contains an additive α , and $\Delta E_{add}(AN)$ is smaller than $\Delta E_{sol}(AN)$, (claims 1-29.) The electrolyte may include a polymer separator and includes crosslinkable materials (col. 4, line 15-col. 5, line 25.) The electrolyte additive includes a variety of sulfates (claims 1-4 and 19-29.) Benzyl (phenyl) sulfate is noted with an additional R group where R is

Art Unit: 1745

methyl (col. 6, line 35 to col. 7, line 45.) Dimethyl sulfoxide is taught in claim 9. The concentration of additive is in the range of 0.001-30 parts by weight. A plurality of solvents are taught including carbonates, which is noted as a solvent in applicant's instant specification (page 27.) Glymes, such as di- and tri- methoxymethane, acetonitrile, tetrahydrofuran and glycol ethers are noted (claims 8-10.) Lithium nickel compound oxides are taught in col. 3, lines 55-end. It is noted that the compound oxide does not require other elements where the variables are equal to zero. Thus, the claims are anticipated.

Claims 1-3, 10, 11 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Hideki et al. (JP 2000-021446.)

Hideki et al. (JP 2000-021446) teaches a teaches a lithium secondary cell comprising a cell element which comprises a positive electrode, a negative electrode, an electrolyte comprising a non-aqueous solvent and a solute, and a variable shape casing which accommodates the cell element, wherein the cell element contains an additive α ; and ΔE_{add} (AN) is smaller than ΔE_{sol} (AN). The reference teaches lithium nickel oxides and a laminated casing of a resin layer and a gas barrier layer. Thus, the claims are anticipated.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mikhaylik (US 6,436,583) OR Gan et al. (US 6,444,360) OR Hideki et al. (JP 2000-021446), as applied to the claims above, in view of Kurokawa et al. (US 5,308,720.)

The teachings of Mikhaylik (US 6,436,583), Gan et al. (US 6,444,360) and Hideki et al. (JP 2000-021446) have been presented. The references teach lithium batteries as noted, however, do not teach that the positive electrode includes a lithium-nickel compound oxide wherein the specific surface area of the lithium-nickel compound oxide is within a range of from 0.01 to 10 m²/g.

Kurokawa et al. (US 5,308,720) teaches a lithium secondary cell including a positive electrode that includes a lithium-nickel compound oxide with a specific surface area within a range of from 0.01 to 10 m²/g (col. 3, lines 10-30; claims 1-24 and the examples.) The electrode active materials and the electrolyte salts are lithium materials. The electrolyte solvent includes the same solvents as in the instant specification (col. 3, lines 45-end.) It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a lithium-nickel compound oxide with a specific surface area in a range of from 0.01 to 10 m²/g as taught in Kurokawa et al. (US 5,308,720) into the cathodes taught in Mikhaylik (US 6,436,583), Gan et al. (US 6,444,360) and Hideki et al. (JP 2000-021446) in order to provide a cathode active material with a high discharge capacity (see figure 4 and col. 9, lines 35-45.) Using the lithium nickel complex oxides taught in Kurokawa et al. (US 5,308,720) will allow for the transfer of electrons with a lithium based anode and give improved discharge capacity in a

Art Unit: 1745

lithium battery. The artisan would have found the claimed invention to be obvious in light of the teachings of the references.

Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mikhaylik (US 6,436,583) OR Gan et al. (US 6,444,360) OR Hideki et al. (JP 2000-021446), as applied to the claims above, in view of Osamu et al. (JP 2001-035,495.)

The teachings of Mikhaylik (US 6,436,583), Gan et al. (US 6,444,360) and Hideki et al. (JP 2000-021446) have been presented. The references teach lithium batteries as noted, however, do not teach that the positive electrode includes an organic acid. Osamu et al. (JP 2001-035,495), however teaches a lithium secondary cell including a divalent lithium organic acid added to the cathode material in an amount of 0.1-3 wt. percent (abstract, para. 20-25.) The electrode active materials and the electrolyte are lithium materials. It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the organic acid taught in Osamu et al. (JP 2001-035,495) into the cathodes taught in Mikhaylik (US 6,436,583), Gan et al. (US 6,444,360) and Hideki et al. (JP 2000-021446) in order to improve the bonding strength of the active material (para. 13.) The artisan would have found the claimed invention to be obvious in light of the teachings of the references.

Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Ruthkosky whose telephone number is 571-272-1291. The examiner can normally be reached on FLEX schedule (generally, Monday-Thursday from 9:00-

Art Unit: 1745

6:30.) If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free.)

Mark Ruthkosky

Primary Patent Examiner

Art Unit 1745



3.22.07